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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/644,443

08/19/2003

Kanwal K. Raina

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06/15/2004

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EXAMINER

ROY, SIKHA


ART UNIT

PAPER NUMBER

2879

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/644,443	RAINA ET AL.	
	Examiner	Art Unit	
	Sikha Roy	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0803</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities:

Page 1 section [0002] "U.S. Patent Application Serial Number 09/ 388,697"
should be updated.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 5 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,902,650 to Feng et al.

Referring to claim 5 Feng discloses (Fig. 2 column 5 lines 30-40) a field emission display device 50 comprising a substrate 54, a conductive layer 62 over the substrate, covered by a resistive layer 52 of amorphous silicon doped with nitrogen and phosphorus (column 6 lines 31-40), a dielectric layer 56 over the resistor layer and a gate electrode (metal layer) 58 on the dielectric layer. Regarding the conductive layer being diffusion –resistant the examiner notes that resisting diffusion is inherent to the conductive layer (cathodic structure) 62 covered by nitrogen and phosphorus doped amorphous silicon. It is elementary that mere recitation of a newly discovered function

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or property, inherently possessed by things in the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. *In re Swinehart*, 169 USPQ 226 (CCPA 1971). Thus, the functional limitation of diffusion-resistant conductive layer is taught by Feng under the principles of functional inherency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4, 6, 7 and 9, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,211,608 to Raina et al. and further in view of U.S. Patent 5,902,650 to Feng et al.

Regarding claims 1, 6 and 7 Raina discloses (column 6 lines 11-17, 45-47 Fig. 4) a resistive structure comprising cathode conductive layer 56 made of aluminum and a resistor layer of boron-doped amorphous silicon layer 60 formed over the conductive layer.

Raina does not disclose the resistor layer comprising amorphous silicon doped with nitrogen and phosphorus.

Feng in analogous art of field emission display device discloses (column 5 lines 30-40, column 6 lines 31,32,39,40) a resistive layer 52 of amorphous silicon doped with nitrogen and phosphorus formed over the cathode conductive layer. Feng further discloses (column 3 lines 32-50) this doped amorphous silicon film possesses the property of precisely controlled electrical conductivity and low stress.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the resistor layer of Raina et al. by the resistive layer of amorphous silicon doped with nitrogen and phosphorus as taught by Feng et al. for providing controlled resistivity of the resistor.

Raina and Feng do not disclose the concentration of doping elements: 5-15 atomic percentage of nitrogen and about 1×10^{20} to 5×10^{20} atoms/cm³ of phosphorus in amorphous silicon resistor.

It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Feng discloses (column 3 lines 37-45, column 8 lines 65 through column 9 line 5) by changing the phosphorus content the n-type electrical conductivity of the amorphous silicon film can be changed i.e. increasing the phosphorus content increases the electrical conductivity and changing the nitrogen content the resistivity can be changed. Hence the concentration of doping elements phosphorus and nitrogen can be identified as result-effective variable for providing the resistor with desired resistivity. Thus, it would

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have been obvious to one of ordinary skills in the art at the time the invention was made to specify the concentrations of nitrogen and phosphorus in the doped amorphous silicon resistor of Feng with desired resistivity, since discovering an optimum value of a result variable is considered within the skills of the art.

Regarding claim 3 Raina discloses (column 6 lines 14,15) the conductive layer has a thickness in the range from 2,000 °A and 2,500 °A.

Regarding claim 4 Raina discloses (column 6 lines 59-64) the resistor layer disposed over the conductor layer has a thickness in the range from 3000°A to 5000°A.

Claims 9 and 10 essentially recite the same limitations as of claims 5 and 1 and hence are rejected for the same reason.

Claims 2, 8, 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,211,608 to Raina et al. and U.S. Patent 5,902,650 to Feng et al. and further in view of U.S. Patent 6,019,657 to Chakvorty et al.

Regarding claims 2 and 8 Raina and Feng do not disclose a conductive layer of chromium formed between aluminum layer and resistor layer.

Chakvorty in the same field of endeavor discloses (column 7 lines 47,48 and column 8 lines 20-28) the deposition of layer of chromium as a cladding material on the layer of aluminum. Further it is noted that the use of cladding layer prevents significant inter-diffusion of aluminum and makes good electrical contact with the overlying resistor layer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the conductive layer of aluminum of the field emission device of

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Raina and Feng by the cathode structure of aluminum layer overlain by chromium layer as taught by Chakvorty et al. for preventing diffusion of aluminum in the overlying resistor layer.

Claim 11 essentially recites the same limitations as of claim 8 and hence is rejected for the same reason.

Claim 12 recites the same limitation of claims 6 and 8 and hence is rejected for the same reason.

Claims 13 and 14 essentially recite the same limitations as of claims 3 and 4 respectively and hence are rejected for the same reasons (see rejection of claims 3 and 4).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S.R.

Sikha Roy
Patent Examiner
Art Unit 2879

MMg 6/10/04
Mariceli Santiago
AV 2879